TECHNICAL NOTES

LAKE STATES FOREST EXPERIMENT STATION
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Effect of Simulated Snowshoe Hare and Deer Damage on Some Conifers planted in the Lake States[1].

owshoe hares and white-tailed deer often nip off the shoots of young conifers causing rious damage to tree plantations and natural reproduction. To assess the seriousss of such damage an experiment was undertaken on the Nicolet National Forest in rtheastern Wisconsin in which nipping was simulated by clipping nursery-grown stock the species and age classes most widely planted in the Lake States. The three jectives of the study were to determine the effect of clipping on (1) mortality; height growth; and (3) form of the trees. One test was started in the spring of 41 in which the terminal shoots of jack pine (1-0 and 2-0 stock) and red pine (2-0 d 2-1 stock) were clipped one or more times one inch below the terminal bud in the rmant season. No lateral branches were clipped. The treatment given was typical deer and hare nippings observed on recently established tree plantations. The 00 trees used in the test were field planted at 5-foot intervals in furrowed rows. a second test started in the fall of 1942, planting stock of white pine (2-0 and 2-1); ite spruce (2-2), and red pine (2-0) was clipped in the same manner and set out in Hugo Sauer Nursery in rows spaced 1-foot apart. In all 1,200 trees were used in s portion of the study.

sults, six years after treatment (see Tables 1 and 2 on back of this sheet), show t the removal of one inch of the terminal growth by single or repeated clippings luces survival and height growth of planted stock. Resistance to damage varied by ecies and can be attributed to the inherent ability of each species to produce new ders. The species tested ranked as follows in descending order of sensitivity clipping damage: red pine, white pine, jack pine, and white spruce. Clipping ured larger classes of planting stock less than smaller ones. In general it may concluded that clipping had a greater effect on height growth than on mortality. o, clipping exerted more effect on survival of small trees than on larger trees ause a larger percentage of the leaf area was removed. However, loss in height of equal importance since it reduces the tree's ability to compete with others in stand. No apparent effect on the form of the trees was noted since none became ltiple-stemmed. The practical application of the findings is that the older classes planting stock, especially the transplant trees, should be used where deer and snowe hare damage may occur, because they can better withstand browsing. Also, wse-tolerant species should be selected where the problem is serious.

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[1] See The Journal of Wildlife Management, 17:487-494, October 1953, for a more ailed account.

H. STOECKELER, Forester
te States Forest Experiment Station

L. W. KREFTING, Biologist
U. S. Fish and Wildlife Service

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Table 1.--Sixth year field survival and height of jack pine and red pine.[1]

Treatment	Survival in Percent				Height in feet			
	Jack Pine		Red Pine		Jack Pine		Red Pine	
	1-0	2-0	2-0	2-1	1-0	2-0	2-0	2-1
Check (no clipping)	82.2	86.5	89.5	82.5	4.8	5.7	2.6	3.0
Clipped once	82.0	80.0	72.2^{xx}	82.0	4.8	5.0^{xx}	2.0^{xx}	2.5^{xx}
Clipped twice	70.0	84.8	69.0^{xx}	79.0	4.5^{x}	5.4^{x}	1.8^{xx}	2.1^{xx}
Clipped three times	74.5	86.5	66.0^{xx}	69.2^{xx}	4.3^{xx}	4.9^{xx}	1.6^{xx}	1.9^{xx}
Clipped twice in alternate years	75.0	84.5	74.0^{xx}	74.0^{xx}	4.3^{xx}	5.2^{xx}	1.9^{xx}	2.2^{xx}

[1] Based on 4 replications of 50 trees each, in each of two separate tests, started in 1941 and 1942 respectively.

^{x} Significantly poorer than check at 5 percent level.

^{xx} Significantly poorer than check at 1 percent level.

Table 2.--Sixth year nursery survival and height of white pine, white spruce and red pine.

Treatment	Survival in Percent				Height in feet			
	White Pine[1]		White Spruce[1]	Red Pine[2]	White Pine[1]		White Spruce[1]	Red Pine[2]
	2-0	2-1	2-2	2-0	2-0	2-1	2-2	2-0
Check (no clipping)	84	92	98	86	3.1	4.2	2.7	5.1
Clipped once	74	88	92	71[3]	2.7	3.8	2.7	4.1^{x}
Clipped twice	78	87	91	--	2.3^{xx}	3.9	2.6	--
Clipped three times	58	78	88	--	1.9^{xx}	3.1^{xx}	2.5	--
Clipped twice in alternate years	62	82	98	--	2.2^{xx}	3.8	2.4	--

[1] Based on 2 replications of 25 trees each.

[2] Based on 4 replications of 25 trees each.

[3] A second treatment made the following year gave an average survival of 82 percent and an average height of 3.3 feet. The latter value is significantly poorer than the check at the 1 percent level.

^{xx} Significantly poorer than checks at 1 percent level.